PATENT
Docket No. 112174-014.UTL
(formerly ENSEMB.031A)

CURRENT CLAIMS

1. (PREVIOUSLY PRESENTED) A frequency division duplexing (FDD) wireless communication method for use by a base station, a first terminal, and a second terminal, wherein the base station transmits using a downlink subframe on a first channel and the first and second terminals transmit using an uplink subframe on a second channel, wherein the downlink subframe includes a broadcast preamble, a time division multiplex (TDM) portion, and a Time Division Multiple Access (TDMA) portion, and wherein the TDMA portion includes at least one modulation/forward error correction (PHY) mode with an associated preamble, both of which are intended for the second terminal, the method comprising:

transmitting a broadcast preamble from a base station to a first terminal and a second terminal during a downlink subframe on a first channel;

synchronizing the first terminal and the second terminal to the base station based on the broadcast preamble;

transmitting modulated data from the second terminal to the base station during an uplink subframe on a second channel;

transmitting modulated data from the base station to the first terminal during a TDM portion of the downlink subframe on the first channel after the first terminal is synchronized with the base station;

transmitting a preamble from the base station during a TDMA portion of the downlink subframe on the first channel, wherein the preamble is transmitted after the second terminal has transmitted its modulated data to the base station; and

re-synchronizing the second terminal with the base station based on the preamble transmitted by the base station on the first channel.

2. (PREVIOUSLY PRESENTED) The method of Claim 1, further comprising transmitting modulated data from the base station to the second terminal during the TDMA portion of the downlink subframe on the first channel after the second terminal is re-synchronized with the base station.

3. (PREVIOUSLY PRESENTED) The method of Claim 2, further comprising transmitting a broadcast downlink map during the downlink subframe from the base station

which indicates when the TDM portion of the downlink subframe transitions to the TDMA portion of the downlink subframe.

4. (PREVIOUSLY PRESENTED) The method of Claim 3, wherein the broadcast downlink map includes at least one time indicator and an associated downlink interval usage code (DIUC), wherein the DIUC indicates the TDMA portion.

5. (PREVIOUSLY PRESENTED) The method of Claim 4, further comprising transmitting a broadcast uplink map during the downlink subframe by the base station which indicates when the second terminal is scheduled to transmit to the base station during the uplink subframe on a second channel.

6. (PREVIOUSLY PRESENTED) The method of Claim 5, wherein the broadcast downlink map identifies a beginning of the TDMA portion within the downlink subframe and the broadcast uplink map identifies when the second terminal is scheduled to transmit during a next uplink subframe.

7. (PREVIOUSLY PRESENTED) The method of Claim 5, wherein the downlink subframe and the uplink subframe have a combined duration of 0.5 milliseconds.

8. (PREVIOUSLY PRESENTED) The method of Claim 5, wherein the downlink subframe and the uplink subframe have a combined duration of 1 milliseconds.

9. (PREVIOUSLY PRESENTED) The method of Claim 5, wherein the downlink subframe and the uplink subframe have a combined duration of 2 milliseconds.

10. (PREVIOUSLY PRESENTED) The method of Claim 5, wherein the duration of the downlink subframe on the first channel and the duration of the uplink subframe on the second channel vary over time.

11. (PREVIOUSLY PRESENTED) The method of Claim 5, further comprising transmitting modulated data from the first terminal to the base station during the uplink subframe on the second channel.

12. (PREVIOUSLY PRESENTED) The method of Claim 11, wherein transmitting by the second terminal and transmitting by the first terminal are performed using different PHY modes.

13. (PREVIOUSLY PRESENTED) The method of Claim 11, wherein transmitting to the first terminal and transmitting to the second terminal, both by the base station, is performed using different PHY modes.

14. (PREVIOUSLY PRESENTED) The method of Claim 11, wherein transmissions during the uplink subframe and the downlink subframe are modulated using Quadrature Amplitude Modulation (QAM) symbols of adaptable modulation density.

15. (PREVIOUSLY PRESENTED) The method of Claim 11, wherein transmissions during the uplink subframe and the downlink subframe comprise Orthogonal Frequency Division Multiplexing (OFDM) symbols of adaptable modulation density.

16. (PREVIOUSLY PRESENTED) The method of Claim 12, wherein the first terminal and the second terminal use the same modulation type with different forward error correction types.

17. (PREVIOUSLY PRESENTED) The method of Claim 2, wherein the first terminal operates in a full-duplex fashion and the second terminal operates in a half-duplex fashion.

18. (PREVIOUSLY PRESENTED) The method of Claim 2, wherein the first and second terminals operates in a half-duplex fashion.

19. (PREVIOUSLY PRESENTED) The method of Claim 18, further comprising transmitting modulated data by the first terminal on a second channel during an uplink subframe after the first terminal receives modulated data during the downlink subframe.

20. (PREVIOUSLY PRESENTED) The method of Claim 18, further comprising transmitting modulated data by the second terminal on a second channel during an uplink subframe before the second terminal receives modulated data during the downlink subframe.

21. (PREVIOUSLY PRESENTED) The method of Claim 2, wherein the first and second terminals operate in a full-duplex fashion.

22. (PREVIOUSLY PRESENTED) The method of Claim 21, further comprising transmitting the TDMA portion during the downlink subframe from the base station using a smart antenna.

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26. (PREVIOUSLY PRESENTED) A time division duplexing (TDD) wireless communication method for use by a base station and a first terminal and a second terminal, wherein the base station transmits using a downlink subframe and the terminals transmit using an uplink subframe, both on the same channel, wherein the downlink subframe includes a broadcast preamble and a Time Division Multiple Access (TDMA) portion, and wherein the TDMA portion includes a first modulation/forward error correction (PHY) mode with an associated preamble which is only intended for the first terminal, and a second PHY mode with an associated preamble which is only intended for the second terminal, the method comprising:

transmitting a broadcast preamble from a base station to a first terminal and a second terminal during a downlink subframe;

synchronizing the first and the second terminals to the base station based on the broadcast preamble;

transmitting a first preamble by the base station using a smart antenna to only the first terminal after transmitting the broadcast preamble, wherein the first preamble is associated with a first PHY mode;

re-synchronizing the first terminal with the base station based on the first preamble transmitted by the base station;

transmitting modulated data from the base station using the smart antenna to only the first terminal during the downlink subframe using the first PHY mode after the first terminal is synchronized with the base station;

transmitting a second preamble from the base station using the smart antenna to only the second terminal after transmitting the modulated data to the first terminal, wherein the second preamble is associated with a second PHY mode; and

re-synchronizing the second terminal with the base station based on the second preamble transmitted by the base station.

27. (PREVIOUSLY PRESENTED) The method of Claim 26, further comprising transmitting modulated data from the base station to only the second terminal during the

downlink subframe using the second PHY mode after the second terminal is synchronized with the base station.

28. (PREVIOUSLY PRESENTED) The method of Claim 27, further comprising transmitting a broadcast downlink map by the base station and during the downlink subframe which indicates when the first preamble is to be transmitted by the base station.

29. (PREVIOUSLY PRESENTED) The method of Claim 28, wherein the broadcast downlink map includes at least one time indicator and a downlink interval usage code (DIUC), wherein the DIUC is indicative of the first PHY mode.

30. (PREVIOUSLY PRESENTED) The method of Claim 29, further comprising transmitting a broadcast uplink map by the base station and during the downlink subframe which indicates when the first terminal is to transmit modulated data to the base station during an uplink subframe.

31. (PREVIOUSLY PRESENTED) The method of Claim 30, wherein the downlink subframe and the uplink subframe have a combined duration of 0.5 milliseconds.

32. (PREVIOUSLY PRESENTED) The method of Claim 30, wherein the downlink subframe and the uplink subframe have a combined duration of 1 milliseconds.

33. (PREVIOUSLY PRESENTED) The method of Claim 30, wherein the downlink subframe and the uplink subframe have a combined duration of 2 milliseconds.

34. (PREVIOUSLY PRESENTED) The method of Claim 30, wherein the duration of the downlink subframe and the duration of the uplink subframe vary over time.

35. (PREVIOUSLY PRESENTED) The method of Claim 30, wherein transmitting to the first terminal and transmitting to the second terminal, both by the base station, is performed using different PHY modes.

36. (PREVIOUSLY PRESENTED) The method of Claim of 35, wherein transmissions during the uplink subframe and the downlink subframe are modulated using Quadrature Amplitude Modulation (QAM) symbols of adaptable modulation density.

37. (PREVIOUSLY PRESENTED) The method of Claim 35, wherein transmissions during the uplink subframe and the downlink subframe comprise Orthogonal Frequency Division Multiplexing (OFDM) symbols of adaptable modulation density.

38. (PREVIOUSLY PRESENTED) The method of Claim 35, wherein the first terminal and the second terminal use the same modulation type with different forward error correction types.

39. (PREVIOUSLY PRESENTED) A frequency division duplexing (FDD) wireless communication system including a base station, at least one full-duplex terminal, and at least one half-duplex terminal, wherein the base station transmits using a downlink subframe on a first channel and the full-duplex and half-duplex terminals transmit using an uplink subframe on a second channel, wherein the downlink subframe includes a broadcast preamble, a time division multiplex (TDM) portion, and a Time Division Multiple Access (TDMA) portion, and wherein the TDMA portion includes at least one modulation/forward error correction (PHY) mode with an associated preamble, both of which are intended for the at least one half-duplex terminal, the system comprising:

at least one half-duplex terminal configured to alternate between transmitting on a first channel and receiving on a second channel;

at least one full-duplex terminal configured to transmit on the first channel while receiving on the second channel; and

a base station configured to transmit a broadcast preamble to the half-duplex terminal and the full-duplex terminal during a TDM portion of a downlink subframe and to transmit a preamble during a TDMA portion of the downlink subframe, wherein the half-duplex terminal synchronizes with the base station based on the broadcast preamble and re-synchronizes with the base station based on the preamble.

40. (PREVIOUSLY PRESENTED) The system of Claim 39, further comprising a smart antenna coupled to the base station and configured to transmit the preamble to only the at least one half-duplex terminal during the TDMA portion of the downlink subframe.

41. (PREVIOUSLY PRESENTED) A time division duplexing (TDD) wireless communication system including a base station, a first terminal, and a second terminal, wherein the base station transmits during a downlink subframe and the first and second terminals transmit during an uplink subframe, both on a same channel, wherein the downlink subframe includes a broadcast preamble and a Time Division Multiple Access (TDMA) portion, and wherein the TDMA portion includes a first modulation/forward error correction (PHY) mode with an

associated preamble which is only intended for the first terminal, and a second PHY mode with an associated preamble which is only intended for the second terminal, the system comprising:

a first terminal configured to alternate between transmitting and receiving on a first channel;

a second terminal configured to alternate between transmitting and receiving on the first channel;

a base station configured to transmit a broadcast preamble to the first and second terminals during a TDM portion of a downlink subframe and to transmit a preamble during a TDMA portion of the downlink subframe, wherein the first terminal synchronizes with the base station based on the broadcast preamble and re-synchronizes with the base station based on the preamble; and

a smart antenna coupled to the base station and configured to transmit the preamble to only the first terminal during the TDMA portion of the downlink subframe.

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44. (PREVIOUSLY PRESENTED) A frequency division duplexing (FDD) wireless communication method for use by a base station and a first terminal and a second terminal, wherein the base station transmits using a downlink subframe on a first channel and the terminals transmit using an uplink subframe on a second channel, wherein the downlink subframe includes a broadcast preamble and a Time Division Multiple Access (TDMA) portion, and wherein the TDMA portion includes a first modulation/forward error correction (PHY) mode with an associated preamble which is only intended for the first terminal, and a second PHY mode with an associated preamble which is only intended for the second terminal, the method comprising:

transmitting a broadcast preamble from a base station to a first terminal and a second terminal during a downlink subframe on a first channel;

synchronizing the first and the second terminals to the base station based on the broadcast preamble;

transmitting a first preamble by the base station using a smart antenna on the first channel to only the first terminal after transmitting the broadcast preamble, wherein the first preamble is associated with a first PHY mode;

re-synchronizing the first terminal with the base station based on the first preamble transmitted by the base station;

transmitting modulated data from the base station using the smart antenna on the first channel to only the first terminal during the downlink subframe using the first PHY mode after the first terminal is synchronized with the base station;

transmitting a second preamble by the base station using the smart antenna on the first channel to only the second terminal after transmitting the modulated data to the first terminal, wherein the second preamble is associated with a second PHY mode; and

re-synchronizing the second terminal with the base station based on the second preamble transmitted by the base station.

45. (PREVIOUSLY PRESENTED) The method of Claim 44, further comprising transmitting modulated data from the base station on the first channel to only the second terminal during the downlink subframe using the second PHY mode after the second terminal is synchronized with the base station.

46. (PREVIOUSLY PRESENTED) The method of Claim 45, further comprising transmitting a broadcast downlink map by the base station and during the downlink subframe which indicates when the first preamble is to be transmitted by the base station.

47. (PREVIOUSLY PRESENTED) The method of Claim 46, wherein the broadcast downlink map includes at least one time indicator and a downlink interval usage code (DIUC), wherein the DIUC is indicative of the first PHY mode.

48. (PREVIOUSLY PRESENTED) The method of Claim 47, further comprising transmitting a broadcast uplink map by the base station and during the downlink subframe which indicates when the first terminal is to transmit modulated data on a second channel to the base station during an uplink subframe.

49. (PREVIOUSLY PRESENTED) The method of Claim 48, wherein the downlink subframe and the uplink subframe have a combined duration of 0.5 milliseconds.

50. (PREVIOUSLY PRESENTED) The method of Claim 49, wherein the downlink subframe and the uplink subframe have a combined duration of 1 milliseconds.

51. (PREVIOUSLY PRESENTED) The method of Claim 49, wherein the downlink subframe and the uplink subframe have a combined duration of 2 milliseconds.

52. (PREVIOUSLY PRESENTED) The method of Claim 49, wherein the duration of the downlink subframe and the duration of the uplink subframe vary over time.

53. (PREVIOUSLY PRESENTED) The method of Claim 49, wherein transmitting to the first terminal and transmitting to the second terminal, both by the base station, is performed using different PHY modes.

54. (PREVIOUSLY PRESENTED) The method of Claim of 53, wherein transmissions during the uplink subframe and the downlink subframe are modulated using Quadrature Amplitude Modulation (QAM) symbols of adaptable modulation density.

55. (PREVIOUSLY PRESENTED) The method of Claim 53, wherein transmissions during the uplink subframe and the downlink subframe comprise Orthogonal Frequency Division Multiplexing (OFDM) symbols of adaptable modulation density.

56. (PREVIOUSLY PRESENTED) The method of Claim 53, wherein the first terminal and the second terminal use the same modulation type with different forward error correction types.

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